

TIME DEPENDENCE OF THE pH OF RAIN

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ABSTRACT

Standard procedures for determining the pH of rain samples usually involve substantial delays from the time of rainfall to the time of analysis. This assumes that no change in pH occurs during the storage period. We have found that this is not always true. We have determined that individual rain water samples possess a time dependent pH which can be correlated with the surface wind trajectories terminating at our sampling location (Schenectady, New York). Our preliminary investigations have identified four characteristic time dependent behaviors: 1) if the trajectories generally proceeded from the west along the Mohawk Valley the pH gradually increased by about 1/3 in 2 to 4 days; 2) if the trajectories were from the south up the Hudson Valley the pH remained constant; 3) if they came from the east across southern Massachusetts the pH gradually increased by about 1/6; and 4) if they came from the north and west across the southern Adirondack Mountains the pH increased by about 1/5 in a few hours. After these changes occurred, the pH remained constant. No correlations occurred between pH and either surface winds at the time of precipitation or the 500 mb trajectories. This data suggests that for rain water, a time dependent behavior, the $[H^+]$ is understated by as much as an order of magnitude.

The samples of rain were collected by a glass funnel. As soon as sufficient water was obtained in glass bottles they were taken inside and a series of pH measurements was immediately started.